L3: Entry 1 of 2 File: USPT Nov 27, 1979

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DOCUMENT-IDENTIFIER: US 4175646 A

TITLE: Electric parking brake

DATE-ISSUED: November 27, 1979

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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APPL-NO: 05/902348 [PALM]
DATE FILED: May 3, 1978

INT-CL-ISSUED: [02] F16D 65/36

INT-CL-CURRENT:

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CIPS	F16 D 65/14	20060101
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CIPS	B60 T 13/00	20060101
CIPS	B60 T 13/74	20060101

US-CL-ISSUED: 188/156; 188/162
US-CL-CURRENT: 188/156; 188/162

FIELD-OF-CLASSIFICATION-SEARCH: 188/2R, 188/3R, 188/18A, 188/71.1, 188/72.4, 188/156, 188/162
See application file for complete search history.

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected Search ALL Clear

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
☐	2251521	August 1941	McIntyre et al.	188/162
☐	2403870	July 1946	Martin	188/162 X
☐	2672223	March 1954	Butler	188/72.4 X
☐	2734590	February 1956	Hays	188/2R X

☒	2933159	April 1960	Steibinger	188/162 X
☒	3204725	September 1965	McGraw	188/156 X
☒	3915260	October 1975	Kim	188/2R

ART-UNIT: 315

PRIMARY-EXAMINER: Reger; Duane A.

ATTY-AGENT-FIRM: Fulwider, Patton, Rieber, Lee & Utecht

ABSTRACT:

A hydraulic parking brake with an electric actuator is provided for an automotive vehicle and is adapted for use with a hydraulic brake system in the vehicle. A manually operated switch engages an electric motor which drives a ram to increase hydraulic pressure to force the caliper pads or brake shoes of a brake into engagement with a brake disk or drum. The electric motor is equipped with associated limit switches, which disengage the motor following operation to prescribed limits. A torsion spring is part of the mechanism that activates the hydraulic master cylinder. This spring holds hydraulic pressure within a range of pressure values adequate to hold the brake and still avoid damage to the brake components. This ensures that the electric motor can travel far enough to activate the limit switches.

7 Claims, 6 Drawing figures

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L3: Entry 2 of 2 File: USOC Sep 8, 1959

US-PAT-NO: 2903097
DOCUMENT-IDENTIFIER: US 2903097 A

TITLE: Railway car brake mechanism

DATE-ISSUED: September 8, 1959

INT-CL-CURRENT:

TYPE	IPC	DATE
CIPP	B61 H 5/00	20060101

US-CL-CURRENT: 188/59; 188/206R, 188/33, 188/53

DOCUMENT TEXT:

C. R. BUSCH Sept. 8i 1959 2p9O3pO97 RAILWAY CAR BRAKE MECHANISM Filed Sept. 6, 1955 8 Sheats-@Sheet 1 0 0 - - - - - -71- -t 77= INVENTOR BY tg N ORN

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Sept. 8, 1959 C. R. BUSCH .903,097 RAILWAY CAR BRAKE MECHANISM Filed Sept. 6, 1955 8 Sheets-Sheet 3 Ul Ld INVENTOR BY ATTORNEY

Sept. 8, 1959 C. R. BUSCH 2.,903tO97 RAILWAY CAR BRAKE MECHANI8M Filed' Sept 6, 1955 8 Sheets-Sheet 4 7116 col 16 -pg.7. v 4 4 , 1 1 1 4 .4,0 161, INVENTOR: ATTO

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,-,I,t. 8, 1959 C. R. BUSCH 2,903,097 RAILWAY CAR BRAKE MECHANISM Filed Sept. 6, 1955 8 Sheets-Sheet 8 -79- 17. -T, 916 INVENTOR: BY @TT 0 R N E Y

United Siates Patent Of-('ic 2@003@001 2,903,097 RAILWAY CAR BRAKE MECHANISM Charles R. Busch, Orange, N.J., assignor to Buffal6 Brake Beam Company, a corporation of New York Application September 6, 1955, Serial No. 532, 635 23 Claims. (Cl.!188-59) The present invention relates to railway car brake mechanisms, especially of the freight type, and is an improvement upon the mechanism shown and described in copending application Serial No. 491,838, filed March 3, 1955. In the railway car brake mechanism disclosed in the aforesaid. application, four linkages in each car truck, powered from a single source, operate brakes against brake discs rotatable with respective car wheels. The car body is mounted on a bolster, spring-

supported at its ends on side structures, such as the side frames Of the truck, and each of the linkages comprises an L- shape brake head lever, having one leg extending along the bolster and pivotally connected to a bracket affixed to a side fraine, and having the other leg extending transversely of tl-le bolster and carrying the brake head for the brake shoe. Every truck has four of &@ese brackets for the four linkages respectively, arran-ed in pairs at each end of the bolster, the brackets of each pair flanking the bolster and being connected to the corresponding side frame on opposite sides of the bolster guide opening in said side frame, The brake head levers are supported in horizontal position for horizontal braking movement mainly through their pivotal connections with the brackets secured to the side frames, and since these levers are comparatively hea,vy, they tend to affect adversely the stability and the steadiness of @the meheanism and to exert heavy bending stresses on the pivotal connections. Moreover, during brake application, forces are exerted on these levers substantially vertically up or down depending on the direction of rotation on the wheels being braked. Such vertical braking forces also exert bending stresses on the pivot connections. Moreover, the operation of the brakes through the brake head levers tends to plill the side frames inwardly' so that the bolster has to serve as a compression member holding the side frames in correct position on the center lines of the journals. Power is applied to the brake head levers of each car truck through a bridle beam extending horizontally across the center line. of the car trurk with its middle region substantially on said center line. In one embodiment of the present invention, the intermediate section of this beam is supported from the car body by a lever poweractuated by a pull rod from a remote source of power' and brake applying power is transmittedfrom the beam to the brake head levers by conner-tions including flexible couplings to allow for relative vertical movement between the braking parts of the meclianism and the power applying parts. These flexible couplings afforct little or no support or guidance for the beam in maintaining its horizontal position. One object of the present inventign is to provide means whereby parts of the,railway car brake mechanism disclosed in the aforesaid application:are supported, steadied, stabilized, guided and strengthened against sag and against the concentration and effect of destructive stresses, e i"Eitented Sept. 8, 1959 2 without interf--ring with effic,ent braking operations aiid while permitting interchangeability between the braking parts on opposite sides of the bolster in each car truck. In accordance,,with certain features of the present in@ 5@ vention, there is provided on each side of the bolster a horizontal equalizer bar connected at the ends to the side frame brackets on tio same side of the bolster. Each brake head lever has on its bottom side a shoe integral or otherwise rigid therewit'i and resting on the 10 corresponding equalizer bar to support and steady the brake head lever. To use this brake head lever on the other side of the bolster for braking action with another of the viheels, the brake head lever would have to be turiied upside down. This would cause the support shoe i5 ta be on the upper part of the brake head lever above the equalizer bar and therefore to be useless, unless aii additional equalizer bar were employed for the shoe in this upper position. To permit the interchangeability of the brake head levers on opposite sides of the bolster, 20 while permitting support of the levers on either side of the bolster, each lever has identical support shoes on its upper and lower sides. With this arrangement, on whichever side of the bolster a brake head lever is used, it will have a lower shoe for support contact with an 25 equalizer bar. In aii alternative form, instead of a single equalizer bar on eaci'i side of the bolster, there are provided on each side two parallel equalizer bars, one above the other, to engage the lower aiyd upper shoes respectively on a brake 30 head levet. With this construction, the two support shoes on eacli, brake licad lever are confined bet@,ween the two superposed equalizer bars, and the lever is thereby coniined in its vertical movement, not only downward but also upward, thereby exerting additional steadying in- 35 fluence on the brake head lever. This dual equalizer bar construction on each side of the bolster is also usefll duriiig braking action, since some brake head levers tend to be raised and others to be lowered during braking action by the rotatin.- wheels, according to the directiort of 40 rotation of these wheels, and the two bars on each side, of the bolster

Iiirit the movements of the brake lover in either vertical direction. As an additional feature, the equalizer bar on the side of the bolster along v,,hich the power applying bridle beam extends has means for supporting the beam in hori- 45 zontal position a.-ainst sag.-ing and for guiding said beam horizontally in its movements in and out of braking position@, The equalizer bar thus serves not only to support and 50 steady the movable parts of the braking mechanism, as described, bi-it also serves as a connecting member between the side frames, assisting the bolster in holding the side frames in proper position slabstantially on the center lines of the journals. 55 In one embodiment of the present invention, an air cylinder on the car body, forming part of the conventional air brake equipment, supplies the power @for operating the brak-es for both trucks of a car. This involves the use of lon.- rods, pivot connections etc., from a re- 60 mote source of pgwer to the points of application of the braking povier on the trucks. Another object of the present invention is t6 provide a railway car truck with power means connected and supported directly on each truck in a new and novel 65 manner to apply brakin.- power to the wheels of each truck effectively from said power means, with a minimum of power transmitting connections and without the use of long connections. In carrying out this object, a fluid power eylinder is provided for and connected to each car truck. One of 70 the aforesaid equalizer bars between the side frames serves to support the power cylinder with its axis along the center

3 line of the car body. The piston rod associated with the power cylinder has a connection to the bridle beam to actulate said beam when braking action is indicated and to move thereby the four brake head levers simultaneously into braking positions. This arrangement not only applies the braking power close to the source of power, thereby eliminating long transmitting connections with their easily wearable pivots and bearings and their readiness to vibrate, but also serves to steady the bridle beam, so that this beam does iaot have to be supported on the equalizer bar, as indicated in connection with the embodiment hereinbefore described. In the embodiments of the invention above described, four similar symmetrically arranged brake head levers are provided, two on each side of the bolster, and these levers are operated from the bridle beam on one side of the bolster by brake arms pivotally joined interinediate their ends to the brake head levers, respegtively. The two brake arms on one side of the bolster are connected to and operated directly from the bridle beam, while the brake arms on the opposite side of the bolster are operated by push rods, pivotally connected to brake arms on opposite sides of the bolster and passing through the bolster. It is apparent that this arrangement involves a substantial number of pivotal and bearing connections from the biidle beam to the brake head levers, and that when this arrangement is operated from a remote source of power, it involves in addition long pivoted transmitting connections from said power source. Connections of this type are easily subject to wear and- vibrations and easily susceptible to the disruptive action of unbalanced and concentrated forces. A further object of the invention is to provide new and improved means whereby the aforesaid arrangement with brake arms and pull rods therebetween is simplified and the number of pivotal and bearing connections is consequently reduced to a minimum. In carrying out this object, instead of employing a single power cylinder on a railway tr- uck on one side of the bolster for ready co-iinection to a bridle beani on the same side of the bolster, there are provided two similar bridle beams on opposite sides of the bolster centered along the center line of the car body and two power cylinders mounted on the two equalizer bars on opposite sides of the bolster and having operating connections to the bridle beams, respectively. The two brake head levers on each side of the bolster are connected to the corresponding bridle beam on the same side of the bolster to operate said levers directly from said bridle beam for braking application, thereby eliminating the brake arnis and the pull rods of the aforesaid embodiments and simplifying the car braking mechanisms. Various other objects, features and advantages of the invention are apparent from the following description and from the accompanyin.- drawings, in which: Fig. I is in general a top plan view of a railway car tr,uck having braking and supporting features constituting one embodiment of the present invention, some of the parts of the

truck being shown broken away to reveal some of the interior structure of the tr,-uck- Fig. 2 is a vertical section taken on iines 2 -2 of Fig. 1; Fig. 3 is a vertical section taken on lines 3-3 of Fig. 1; Fig. 4 is a detail section taken on lines 4-4 of Fig. 3; Fig. 5 is a detail section taken on lines 5-5 of Fig. 3; Fig. 6 is an enlargement of part of Fig. 3; Fig. 7 is an ent-,trgement of another part of Fig. 3; Fig. 8 is 4a detail section taken on lines 8-8 of Fig. 1; Fig. 9 is a detail section of a railway truck with a modified form of braking and supporting features embodying the present invention, the section being taken along lines corresponding to those along which Fig. 3 was taken; 2,903,097 4 Fig. 10 is a,detail section taken along lines 10-10 of Fig. 9; Fig. I I is a detail section of a railway truck with still another modified form of braki@ng and supporting .5 features embodying the present invention, the section being taken along lines corresponding to those along which Fig. 3 was taken; Fig. 12 is a detail section taken, along lines 12-12 of Fig. II; 10 Fig. 13 is a detail section tal-en along lines 13-13 of Fig. 1 1; Fig. 14 is a top plan detail view of a railway trurk showing the modification of the brake mechanism of Figs. 1 1 to 13, some of the parts of the truck being shown 15 broken away to reveal some of the interior structure of @he truck; Fig. 15 is a view, partly in front elevation and partly in vertical section, of a portion of the railway truck shown in Fig. 14; 20 Fig. 16 is a general top plan view partly in horizontal section of a railway truck and shows a further modification of the brake mechanism embodying the present invention; Fig. 17 is a top plan view of a brake head lever forr@i- 25 ing part of the mechanism of Fig. 16; and Fig. 18 is a section of the brake head lever of Fig. 17 taken on lines 18-18 of Figs. 16 and 17. Referring first to Figs. 1 to 8, and especially to Fil-S. I to 3, there is shown a railway freight car tnick com- 30 prising a pair of side structures shown constituting a pair of side frames 10 having guide openings 11 to receive the ends of a truck bolster 12 extending betnveen said frames and projecting at the ends in,,O said openings, where they are supported on coil springs (not shown) and are guided 35 by side columns 13 of said openings for vertical shockabsorbed movement. The bolster 12 is provided at the ends with lugs 14 (Fig. 1) and 15 (Fig. 3) engaging the 8ide columns of the side frames for vertical guided movement therealong and has a center conformation 16 (Figs. 40 1 and 3) for diree-t pivotal connection to the underside of the railway car body. Between the two side frames 10 and supported thereon by suitable bearings are two parallel axles 17 carryin- at opposite ends flanL'@-d car wheels 18 which ride on rails 19. 45 The brakes for the four car wheels 18 of each car truck are operated by four sets of linkages 20 (only two being show@n in Fig. 1) interconnected and actuated from a single source of power. These brake operating linkages 20 are supported from respective brackets 21 flanking 50 the bolster 12 and rigidly connected to the side frames 10 on opposite sides of the bolster guide opening 11. The brackets 21 can be forged or pressed and welded to the side frames 10 so as to be rigid therewith and each bracket is in the form of an L having a short leg ZZ 55 rigidly connected to a corresponding guide bolster column 13 and extending along the corresponding side frame and a longer bracket leg 23 extending inwardly aiid transversely of said side frame- substantiallv midway between the bolster 12 and the adjacent car wheel 18. 60 Each brake operating linkage 20 comprises a brake head piece 25 desirably in the form an an L-shaped lever, one leg 26 of which is pivowly connected to the end of the bracket leg 23 by a hinge or pivot pin 27, and the other leg 28 carryiiig at its end a brake head 29. This 65 brake head 29 carries a shoe 30 for application to a brake rotor or disc 31 affixed to the corresponding axle 17 near the corresponding car wheel 18. Each car truck has four similar brake head levers 25 symmetrically arranged for action on four rotor brake 70 discs 31-, respectively. To actuate the brake head levers 25 for uniform braking action on the respective brake discs 31, there is provided for each pair of opposed brake head levers 25, on opposite sides of the bolster 12, a parallel device comprising a pair of parallel brake arms 35 75 and 36 of equal lengths, pivotally joined intermediate

t@eir ends to@ the elbows of the braie head lev@rs by pins 10 supporting the bolster 12, without tra-nsmitting thes6 37 ' and pivotally interconnected at one

end by a connecting push rod 38 passing throtigh the bolster 12. At their other ends, the brake arnis 35 are power-actuated through a, power input member 40 in the form of a bridle beam, while the oth--r brake arms 36 are fulcrumed against brackets 41 affixed to the side of the bolster' The brake head levers 25 are hollow and have open sides in their legs 26, as shown in Fig.. 8,. a-.id the ends of each push@ rod 38, where it is pivotally connected to the associated brake arms 35 and 36, extend i-.ito a-,id are housed in the cavities of the legs of said brake arnis. The ends of each push rod 38 are forked to receive the flat ends of the brake arms 35 and 36 between the projections of the forlc (Figs@ I to 3 and 8,). Pins 45 hold the ends of the brake arl-ns 35 and 36 in pivotal Imuckle relat,'onship to the ends of the push rod 38. Each push rod 38 at one end has a fixed pivot connection witli the brake arm 35. However, at the other end, the push rod 38 has one or more additional adjusting holes 46 (Fig. 1), to extend the pivotal connection for the brake arm 36 to con-ipensate.'Lor undue brake shoe wear. At the elbow of each brak-e lever 25, where it pivotally connects iiito the intermediate sections of the corresponding brake arm 35 or 36, this elbow is provided with bosses 47 (Fig. 8) extendina inwardly from opposite walls of the brake lever to receive therebetween, with a silug pivotal fit, the ffat internediate section of said brake arm and to receive the hinge pin 37. Power is applied to the brake arms 35 on each car truck through &ie beam 40 (Figs. 1, 3, 4 aild 7). This beain 40 extends horizontally across the center line of the car truck with@ its middle point on said center line, and at this region, the, beam is inlegrally fornied with a pair of j-,vxs or projections 48 exte.,id;ng obliquely upwardly and defining therebetween a socket 49 to receive therein the lower end of an inclined lever 50@ A pivot pin 51, passing through these projections 48 and through the lever 50, pivotally connects the lower end of the lever to the beam 40;, The upper elid of the lever 50 is pivotally connected by a p-n 52 to a lever guide 53 in the form of a U-shaped link, pivotally secured at 54 to a lever bracket 55 affixed to a car body bolster 56 secured to the center sill 57 of the car body 58, and to a bottom plate 59 which carries the center plate 59' shown having a pivot extension into the center conformation 16 of the truck bolster 12 (Fig. 1);. The guide 53 has a series of holes 60 (Fig. 4) to permit adjustm.-nts in the location of the pin 52 and to permit corresponding adjustments in the length of the stroke of the beam 40 in its brake applyin,@ - movements; and@ the intermediate section 6f the lever 50 is pivotally secured to a pull rod 63 (Figs. 3, 4 and 7) operated from th.- lever (not shown) of the air cylinder (not shown), supported in the usual rjaanner on the car body and forming part of the conventional air brake equipment. Since the brale head levers 2-:@ and the brake arr@is 35 and 36, formirg part of the linkages 20, are supported on the side frames 10 agaii7@st vertical movenient by the mounting brackets 21 affixed to said side frames, aiid since@ the bean-i 40, associated pull rod 63, lever 50 and air brake cylinder are attached to the car body 58, and therefore are vertically movable witli said car body t@hrough the. bolster spring supports, ffexible copnections are provided between the ends of the beam 40 and the inner ends of the brake arms 35 to allow for relative vertical mover@7ient between the braking parts of the mechanism@ and the@ power arplying parts. Each of these flexible connectio@@is iiicludes a link 65 (Fig. 1) in the form of aii, elongated I.oop pivotally coupled a,. its ends to the ends of the beam 40 and the ends of the brake arms 35 by. means of clevises or shackles 66. The bridle arrangement, with the flexible coniiectioiis- d-escribed, pei-mits 'the car body with the air brake equipraent attached theretop to move up and down against the shock-absorbing action of the springs on the side frames niovements or the stresses therefrom to the brake head levers 25 and@ in tum to the brake shoes 30 carried thereby, and without disturbing the transmission of fult brak- i-@ig power to said shoes from the air brake equipment. Since the bolster 12 is secured to the car body and spring-supported in the side frames 10 for vertical movement and since the brake arms 36 are held against vertical movemeiit by their support from the side frames 10 10 through the side frame brackets 21, the brackets 41 (Fig.]:) oii th-. bolster 12, against which the free ends@ of the brake arins 36 bear, serve as fulcrums for said brake arms, as already described; and in order to pern-iit the up and down movements of the bolster without interfering 15 with the transmission of full

braking power, the free ends of 1,hese brake arms are provided with rounded vertical -Uiu'e channels 67 and the bolster brackets 41 are provided with vertical slide. ffanges 68 seating in said channels and rounded off at their outer edges to permit smooth 20 angular movement of said brake arms about said flanges. With this arrangement, not only are the brake arms 36 fulc.-umed about the bolster brackets 41 in their transmission of braking power to the brake head levers 25 connected thereto, but moreover the brackets 41 are per- 25 mitted to move vert;cally with respect to the brake arms 36@ due to the vertically spring-resisted niovements of the bolster 12, without interrupting the fulcrum connection between the bolster brackets 41 arld the brake arir@s 36. In the operation of the brake mechanisi-n, when the 30 usual air cylinder lever is actuated to apply the brakes, power is transmitted from the. air r-ylinder through said@ cylinder lever to the pull rod 63, causing said rod to move towards the left (Fig. 1). This causes the lever 50, pivotally suspended from the car body, to move angularly 35 towards the left about its upper pivot supporl and the horizontal beam 40 to inove horizontally towards the left. Since the beam 40, is pulled at its center by the mechanism described@ this exerts equal pull at the ends of the beam towards the left, this pull being transmitted 40 to the two brake arms 35 on one side of the bolster 12 through the ffexible connections 65, 66. Considering the upper left-hand lifflage shown in Fig. 1, pull on the brake arm 35 at one endtowards the left causes said brake arm to swing horizontally clockwise about its support at 37 45 at the elbow of the brake head lever 25. Since at the other end of the brake arm 35, this clockwise movenient of the brake arm about its support 37 is resisted by the push rod 38 conrected thereto at this end alid operating the other brake linkage on the opposite side of the bolster 50 12, the pull on the brake arm 35, as described, also causes the brake head lever 25 on the left to swing horizontally clockwise about the axis of its pivot pin 27 on the side frame bracket 21, thereby moving the brake shoe 30 carried by said lever against the brake disc 31 and braking 55 the correspo-@iding car wheel 18. After the brake head lever 25 on the left (Fig. 1) has been immobilized by the brake engagement of its brake shoe 30 with the correspoiiding brake disc 31, the further clockwise i7otation of the brake arm 35 about its support 60 at 37 is continued, causing the push rod 38 to move to the right and ithdreby to swing the brake arm 36 clorkwise about the bracket 41. This m6ves the brake head lever 25 on the right counterclockwise about its pivot support 27 into braking position in relation to the coitesponding 65 brake disc 31. According to the resistances offered by the different parts of the construction and/or the differences in wear in the different linkages 20, the operation, instead of following the sequences described, inay be explained as follows 70 in connection with Fig. 1: When the bridle beam 40 is moved towards the left, the brake arm 35 is swung clockwise about its pivot support 37, thereby moving the push rod@ 38 towards the rl@ht and caus g the brake arm 36 to swing clockwise about the bracket 41. This rotates 75 the brake head lever 25 on the right counterclockwisc

2,903,097 7 about its pivot support 27 until its shoe 30 engages the corresponding brake disc 31, thereby immobilizin-, said brake head lever. Continued movement of the bridle beam 40 towards the left swings the brake arm 35 clockwise about its upper pi-,rotal support to the push rod 38, which pivotal stipport has become inimobilized, thereby causing the brake head lever 25 on the left to swing clockwise about its pivot support 27 until its shoe 30 is in brake engagement with the brake disc 31. Although the two alternative operations have been described as though definite sequences are followed, this has been doiae only to make clear the operation of the construction. Actually, the different linkages 20 operate substantially simidtaneously and if on@ linkage reaches braking position before the others, due perhaps to differences in wear, the interval involved is very small and the linkage reaching braking position first serves as an a.nchorage by which the other linkages are move quickly into braking positions. In every case, the linkages 20 mutually assist each other, since an immobilized brake head lever 25 on one side of the bolster 12, while bearing against its corresponding brake disc 31, at the same time serves as an anr-hora-e by which the opposed brake head lever 25 on the other side of the bolster is quickly moved into braking position in relation to the

corresponding brake disc 31. Except for the manner in which the lever 50 is suppor,ted from the car body, the construction of the car truck with its braking mechanism so far described is disclosed and covered in the af- oresaid copending application. Reference is made to said application for any details of construction and operation not described or disclosed herein. It should be noted that, whenever the brak-es are applied to the brake discs 31 on the wheels 18, the pulls on the, brake head levers 25 tend to pull on the side frame brackets 21 inwardly in a direction transverse to the side frames 10 and to exert bending forces on said brackets tending to break them away from the side frames 10 to which they are ri.- idly secured. Also, the inward pulls on the side frame brackets 21 are transmitted to the side frame-s 10, tending to move these frames inwardly in an inboard direction out of alignment with or out of proper position with respect to the wheel journals. Since the bolster 12 is provided at its ends with lugs 14 engaging the side columns 13 of the side frames 10 for vertical guided movei-nent therealong, these lugs permit the bolster to be used to a certain extent as a compression member holding the side frames in correct position on the center lines of the wheel journals, but these lugs may be insufflc.ient for this purpose, unless they are increased in size from conventional practice to add sufficient strength to the bolster to accept this compressive action. It should also be noted that the horizontal brake head levers 25 are comparatively heavy and project for comparatively long distances from their pivotal or hinge connections at Z7 with the side frame brackets 21, so that unless supported in addition at some other point, the resulting cantilever action wll exert large bending stresses ,on said pivotal connectiods. It should also be noted that the beam 40 is horizontally positioned and, because of its flexible and yieldable connections with the brake head levers 25 and the car body, will be unsteady, unless supported and guided in its horizontal position. As a feature of the presen' , invention, in order to steady and stabilize the different parts of the braking mechanism, to prevent the application of destructive stresses to different pal-ts of the mechanism and especially to the hinge pins 27, and to resist successfully braking forces tending to bring the side frames 10 inwardly in an inboard direction out of parallelism and out of aligpment with the wheel journals, there is provided in the construction of Figs. 1 to 8, tivo equalizer bars 76 on opposite sides of th(@. bqlster 12, each connecting the two side 8 f-rame brackets 121 on the corresponding side of the bolster. For securing each equalizer bar 76 to the corre-' sponding pair of side frame brackets 21, the two hinge pins 27, which pivotally connect the two head levers 25 to said brackets, also pass through the ends of the equalizer bar. To provide the hinge connection between a side frarne bracket 21 and a corresponding brake head lever 25 in a manner to permit anchoring of one end of the equalizer bar 76 to said connection, the bracket lo has a pair of spaced superposed projections 77 and 78 (Figs. 3, 6 a-@id 8) straddling a proiection 80; in the lever 25 to form a knuckle joint therewith, and these projections are retained in interconnccted pivotal relationship by the hinge pin 27 passing through openings in said 15 projection. The equalizer bar 76 is in the form of an angle, o- .ie leg 81 of which is seated at each end upon the lcwer projection 77 of the corresponding side frame bracket 21 and at said end has a hole through which the corresponding hinge pin 27 passes. 20 In order to afford a large bearing area between the equalizer bar 76 at each end and the corresponding hinge pi-ii 27, there is welded or otherwise rigidly affixed to the leg 31 of the equalizer bar at each end over the hole in said leg, a collar 82 located between said leg and the pro- 25 jection 80 on the corresponding brake head le,,rer 25 and embracing the hinge pin with a snug rotative fit. This collar 82 serves not only to provide extra bearing surface for the eq7,ializer bar 76 but also serves to afford clearance for the support shoe on the corresponding brake 30 head lever 25, as will be more fully described. The hinge pin 27 has a head 34 seated on the top projection 78 of the correspondin.- brake head lever 25 and at the lower end has a cotter pin 85 passin.- therethrou,-,h. If desired, to assure against the shearing of the cotter 35 pin 85, a castle nut may be threaded on the lower end of the hinge pin 27 and employed in connection with the cotter pin, as shown in the modification of Figs. 9 to 12. As will now be clear, the cqtializer bars 76, secured to the side frame brackets 21 through the hinge pins!27

as 40 described, assist the bolster 12 in maintaining the truck side frames 10 in alignment or parallel to the respective rails. The equalizer bars 76 also sei-ve the important function of supportin@- the weight of the brake head levers 25, thus relieving the hinge pins 27 from excessive 45 stresses, which will be considerable especially when the brale shoes on said levers are pressed against the wheel discs during a brake application. To the latter end, eacb of the brake head levers 25 has a support shoe 37 at the bottom of the outer end of its leg 26, seated on the 50 top flange leg 81 of the corresponding equalizer bar 76. These support shoes 87 are desirably cast integral with their corresponding brake head levers 25, but they may be welded, riveted, bolted or other-wise made rigid with said levers. The sho-- s 87 support the outer ends of the 55 legs 26 of the corresponding brake head levers 25, and thereby prevent excessive bi-,nding stresses from being transmitted to the hinge pins 27. The shoes 87 on the brake head levers 25 maintain the levers in horizontal position, thereby steadying said levers against vibration 6o during normal running operations when the brakes are disengaged and also guide the levers horizontally in their brake applying and releasing movements. If each of the brake head levers Z5 is provided with a single suppor-t shoe 87 at the bottom, then although the 65 brake head lever aside from the shoe may be placed interchangeably on either end of the bolster 12 or on either side thereof, when the brake head lever is placed on the opposite side of the bolster, it must be turned upside down, so that a shoe which was on the bottom 70 side of the brake head lever when on one side of the bolster will be on the top side when on the opposite side of the bolster. Under these conditions, it would be -ilecessary to provide a left-hand brake head lever and a right-hand brake lever. To avoid this condition, and 75 to malce all of the four brake hcad Ic@vt,@rs 25 on each

tia@k interchqtigeable, each of the brake head levers has two similar support shoes 87 and 88, one on the bottom and one on, the top -in vertical alignment. On either side of the bolster 12" the brake head lever 25 will have a bottom support shoe in seatin- and support- 5 ing engagement with a corresponding equalizer bar 76. The bridle beam 40, is suspended from the car body t@ro-ugh the piv6ted lever 50 @Lnd- at the ends is connected tb the brdke arms 35 and 36 through the flexible con- nections 65 dnd 66, as already described. The beam 40, 10 therefor e, would be somewh@it ulisteady unless supported ftnd To steady the beam 40 and support it in guided . iiontal @osition 'and to guide it for horizontal move- ineiit when@ actu@ted into and out of braking position, t@e equdlizer bar 76 on the same side of the bolster 12 as 15 the beam 40 has secured thereto two supports 90 (Figs. 1, 3i 5 Eind 7) sp@tced to seat the beam at spaced regions thereof neeir their outer ends. These supports 90 are shown in the form bf U-shaped members having a lower leg 91 affixed to the top flange 81 of the equalizer bar 20 76, as for example by rivets, and having an upper leg 92 on which the flat beam 40 rests, as shown more fully in Fig. 5, aiid across which the beam is guided horizon- taily in its brake applying and brake disengaging move- ments. The upp,-r beam supportiiig legs 92 of the sup- 25 ports 90 could, if desired, have a certain amount of inherent elasticity to absorb some of the shocks trans- mitted to the bridle beam 40. Ili the constructions of Figs. I to 8, each of the brak-e head levers 25 has a pair of support shoes 87 and 88, 30 and only one equalizer bar 76 on eacli side of the bolster 12, to engage orly the bottom shoe 87, while the upper shoe 88 remains idle and serves merely to allow for in- tercliang eability of the brake head leier for either side of the bolster. During brake applications, the rotatin@ 35 wheel 1-8 on which the brake is being applied imparts to the corresponding brake head lever a force having a substanti al vertical component which extends tip or down dependi ng on the direction of rotation of the wheel. For example, considering the car truck of Fig. 1, and as- 40 suming that the car is moviii.- towards the iight, the wheels 18 on the left-hand side of the bolster 12 will urge the correspondin.- brake head levers 25 on this side of the bolster dowiiward dtiring bi-ake application, while the wheels 13 on the right-hand s,@de of the bolster 12 will 45 urge the corresponding brake head levers oii ti-ie latter side of the bolster upward during bra-ke application, To hold the brake head levers 25 a.-ainst movements iip or down while retainin.- the features by which the brake head levers may be interchangeably

used on eitl-ier side 50 of the bolster 12, there is showii in the modification of Fi-@s. 9 and 10, oii each side of the bolster, an Lipper second equalizer bar 76ci similar to the lower equalizer bar 76 an-d s--rving as a stop for the i-ipper shoe,@ 88 on the two brake head levers on the corresponding side of 55 the bolster. This upper equalizer bar 76a is also in the form of an angle, and has a flange or leg gla close to the upper projection 78 of the correspondin.- side frame bracket 21 and having a liole to snugly receive the cor- respond ing hin.-@- piii 27a. To afford a large bearing 60 area between each of the upper equalizer bars 76a ancl the correspondin- hinge pin 27a, a collar 82a is welded or otherwise iigid'ly affixed to the leg 8!a of the equalizer bar at each end over the hole in said le@ through whicli the hinge pin passes. With the two equalizer bars 76 aid 76a located on 65 each side of the bolster 12, one above t@ie other, th.- lower shoe 87 on each of the brake head levers 25 seats oi the upper side of the leg 81 of the coitesponding lower eq,ualizer bar 76 and slides therealon.- diiring brake tp- 70 ptication or diseigagement, while the upper shoe 88 on said brake head levers 25 e;ther engages the underside of the leg 81a on the corresponding tipper equalizer bar 76a and slides therealong diiring brake application or dispngagement, or at least is close enough to said leg 81a to 75 cause said lever to be held thereby against u@i@@rd iii'o'v'e-@ ment, except to the smallest extent. With this arrangement, the brake head 16vers 25 are confined and steadied against movemeiit vertically duiing normal running operations and also during brake application and disengagement. Also, the double equalizer bars 76 and 76a on each side of the bolster 12, secured to the side frame brackets 21, serve to sustain the sid'e frames 10 against inward movement out of parallelism with the rails with additional compressive resistance. In the fonn of the invention disclosed in Figs. 11 to 15, instead of providing two separate equalizer bars on each side of the bolster 12 as shown in Figs. 9 and 10, there is providcd a single eqi-ializer bar 76b on each side of the bolster 12, having two webs or flanges 81b for en,@agiiig the upper and lower shoes 87 and 88 on each brake head lever 25. This equalizer bar 76b is desirably in the form of a channel bar, having its upper and lower flanges 81b seated at eacli end on the lower and upper projections 77 and 78 respectively of the corresponding side frame bracket 21 at said end and receiving at said end the corresponding b-inge pin 27h. The lower channel flange 81b has welded or otherwise rigidly affixed thereto, over each hole ttirough which the hinge pin 27b passes, a collar 82b embracing said pin with a snug fit to afford added bearing area between the equalizer bar 76b and said pin. If desired, a similar collar may be provided on the upper flange 81b of the equalizer bar. The eqtializer bar 76b serves as one of its functions to hold the side frames 10 agair.,st inward moveinent out of alignment or parallelism witi@ the ras, as i@.i the constructions of Figs. I to 10. The two shoes 87 and 88 on each brake head lever 25 engage the inner faces of the two flanges 81b of the: corresponding equalizer bar 76b to confine the brake head lever against vertical movements aiid to guide said lever horizontally durin.- brake application and disengagement. The back web or wall 95 of the equalizer bar 76b would have openings 96 therein suffici--ntly large to permit the push rods 38 to pass therethrough. t e forms of the invention shown in Figs ' I to I 0, an air cylinder on the car body, forming par-t of the conve onal air brake equipment, supplies the povier for operating both trucks of a car through the pull rods 63, which are pivotally connected to the intermediate sections of the levers 50 of said trucks and operated from the usual lever (not shown) of the cylinder. In this form of the invention, when the hand brake is used in the conventional manner iiistead of the air power brake, as for example, for prolonged braking peri6ds during loading the braking pressure manually set is I transmitted to the pull rod 63 of each tr-uck, in the manner well known in the art. As a@l additional feature of the present invention and according to the modification of Figs. I I to 15, instead of operating the brakes froin an air cylinder located on the car body remotely from the car trucks and serving both trucks of a car, the power for operating the brakes is derived from an individual fluid power unit 100 on earh track, thereby eliminating the lon.@ pivoted transmitting connections from said unit to the points of application of the brakes. In the specific form shown, this power unit 100 in the fcrm of an air cylinder i-- rigidly sec ured to one of the equaliz-- r bct rs

76b and specifically to the back wall 95 of said bar on the center line of the eq ualizer bar and of the truck. In this air cylinder 100 is a piston 101 with a rod 102 co nnected at one end to said piston and projectin.- out of said cylinder for connoction to the bridle beam 40b. For connectilig the piston rod 102 to the bridle beam 40b, the projecting part of the rod has aii openin@ 10@3 through.which.the. beam passes, and is connected to said beam by a pin 104 passing through said rod in the region of said opening and througjl said beam.

Air under pressure for power braking is carried to the right-hand end of the air cylinder 100 by a flexible hose 105 coming from the body of the car and connected to the main train line on the car. VAien power braking is indicated, air is adn-Litted through the flexible hose 105 into the cylinder 100 to cause the piston 101 therein to move. This m(>Nement of the piston 101 is transmitted to the piston rod 102 and directly therefrom to the bridle beam 40b to cause said beam to apply the four brakes on the wheel discs of the truck in the manner already described. For applying a hand brake to the arrangement of Fi@s. 11 to 15, the outer end of the piston rod 102 terminatoes in a pair of jaws or a fork 106 for receiving the lower end of a lever 1107 and a pivot pin 108 passing through said fork and said lever to pivotally connect said lever directly to said piston rod and to pivotally indirectly connect thereby said lever to the bridle beam 40b. The lever 107 extends upwardly in an inclined direction, and at its upper end is connected by a pin 110 to a guide III in the form of a U- shaped link, pivo@tally connected to a bracket 112 secured to the car body bolster 56 which in turn is secured to the center sill 57 of the car body 58. The guide 111, wl-dch has a series of holes to permit adjustments in the location of the pin 110 and to permit corresponding adjustments in the length @of the stroke of the beam in its hand brake applying movements, is similar in construction to the guide 53 in Fig. 4. The lever 107 extends at a comparatively wide an'le (f-or example at an angle of 57') with the vertical plane, to pern-lit said lever to be straight instead of kinked. For applyiiig the hand brake, the lever 107 is pivotal@@ly attached intermediate its ends to one erld of a hand pull rod 113, the other end of which is atlached to the usual body lever (not shown) of the car. For halid brake application, the pull rod 113 is r@ioved in the usual manner, causing the lever 107 to swing about its upper pivotal support on the guide III into position to move the bridle beam 40b and the brakes to be applied simu@ltan@-ously to the four discs on the wheels of the truck. It is seen &@at, with the cons"ruc'Lion of Figs. 1 1 to 15, the air cylinder is mounted rigidly on the truck side frames 10 and remains rigid duiing the running operation of the car, this bein- most advantageous over other types of disc brakes in which the air cylinder or air cylinders are mounted above the spring line and on the car body. In the construction of Figs. 11 to 15, flexible connections 65b and 66b are provided between the bridle beam 40b and the brake arms 35 to operate these brake arms, these connections being similar to the con7iections 65 and 66 iri the construction of Figs. 1 to 8, except that the loops 65b connecting the clevises 66b might be longer to accommodate the bridle beam. In the construction of Figs. II to 15, in the absence of an air cylinder 100 connected to each car truck as described, and witli the bridle bearn- stipported and operated from a remote air cylinder as in the constr-uction of Figs. 1 to 10, the bridle beam would be supported for horizontal movement by means of two supports, similar to the supports 90 in the construction of Figs. 1 to 8, and rigidly secured to ttle top of the flange 31b of the eqiializer bar 76b. However, wit'ii the direct connection between the piston rod 102 and the bridle beam 40b, as shown in Figs. 14 and 15, the beam will be sufficiently supported and guided for horizontal movement by said piston rod to permit the elimination of special supports similar to the supports 90 of Figs. 1 to 8. ' In the consl,ruction of Figs. 1 1 to 15, with one air cylinder 100 and one br-idle beam 40b to each car truck, although the power source is located close to the regions of applicatiorl of the brakes, thereby climinaling long pivoted transmitting connections between said power source and the bridle beam, there are still pivoted membe,rs between the bridle beani and the brake applying 2,903,097 12 regions. According to the modification of Figs. 16 to 18, two air cylinders 100 are provided for each car truck on opposite sides of the bolster 12c to operate the two

pairs of brake head levers 25c on opposite sides of the- bolster, thereby eliminating the brake anns 35 and 36 and the pull rods 38 with associated pivot and bearing connections employed in the constructions of Figs. I to 15. In the constr- uction of Figs. 16 to 18, the two equalizer channel bars 76b on opposite sides of the bolster 12 are con- 10 nected at their ends to the side frame brackets 21 by pivot pins 27c as in the construction of F.;gs. 11 to 15. These pins 27c also pivotally connect the brake head levers 25c to the side frame brackets 21, as in the construction of Figs. 11 to 15. 15 Connected to the back webs or walls 95 of the equalizer bars 76b are the two air cylinders 109 in axial alignment along the ccnter line of the car trtick but in reverse relationship. Each of these cylinders 100 is stipplied ivith air under pressure when brake application is indicated, 20 by hose connections 105, similar to that shown in Figs. 14 and 15. Instead of one bridle beam 40b for each car truck, as in the construction of Figs. 11 to 15, two bridle beams 40b are provided, each operated from the corresponding 25 air cylinder 100 as in tl-ie construction of Figs. It to 15. This double cylinder and bridle beam arrangement permits each bridle beam 40b to be connected directly to the corresponding brake head lever 25c in the manner to be described. 30 The brake beam levers 25c are modified in construction to permit their direct conneetion to the bridle beams 49b. To that end, each brake beam lever 25c is angular in shape with legs 26c and 28c, as in the construction of Figs. 1 to 15, but the lever has a third leg 120 integral 35 or otherwise rigid therewith and extending substantially in line with the leg 26c. The outer end of each leg 120 is flexibly connected to the corresponding outer end of a bridle beam 40b by a loop 65b and clevises 66b. The four brake head levers 25c are thereby operated directly 40 from the two bridle beams 40b and in turn from the two air cylinders 100 adjacent thereto, without the use of brake arms 35 and 36 and the pull rods 38 employed in the construction of Figs. 1 to 15. The brake head levers 25c have integral or otherwise 45 ri,@id thereviith flan,-es 121 with shoes 87c and 88c adapted to engage the inner confronting faces of the tipper and lower flanges 81c of the equalizer bars 76b, as to be supported on the lower flanges and limited against upward movement by the tipper flanges. 50 The two bridle beams 40b may be operated for band brake application as in the construction of Figs. II to 15 and, except as otherwise indicated, the construction and operation of the mechanism of Figs. 16 to 18 in all respects are similar to those of Figs. I to 15 described. 55 In the construction of Figs. 16 to 18, instead of two cylinders 100, as far as certain aspects of the invention are concerned, a single cylinder 100 may be provided for the two bridle beams 40b and wh;le the piston rod 102 operates directly one of the bridle beams for brake apply- 6o ing operation in the manner described in connection with the construction of Figs. 16 to 18, a reverse connection between said piston rod and the other bridle beam may be employed to cause the latter bridle beam to move- simultaneously in the opposite direction for brake apply- 65 ing operation. In such a construction, the features of the brake head levers 25c with their direct connections to the bridle beams 40b shown in Fi.@s. 16 to 18 could be retained. Also, as far as certain aspects of the invention are con- 70 cerned, the simplified arrangement of Figs. 16 to 18 may be employed in connection with the co-.istruction of Figs. 1 to 10, in which the fluid power is deri-ved from a remote source. In such a construction, two bridle beams would be employed on opposite sides of the bolster and 75 would be operated from the remote source of fluid power,

thest brid.'Io beams would have dirert connections with brake head levers similar to the brglce head levers 25c of Figs. 16 to 18. While the invention has been described with particular io,ference to specific embodiments, it is to be understood ti that it is not to be li-tnited thereto, but is to be constr-ued broadly and restricted solely by the soope of the ap- pended claims. What is claimed is: 1. In a railway car truck, the combination of a pair of 10 opposed side structures extending along the lo- .igitudinal chrection of the truck, a plurality of wheels supported on said side structures, two of said wheels extending co- axially near opposite sides of the truck with their com- mon axis extending between said side structures trans- 15 verse to said longitudinal direction, means for resiliently supporting a railway car on the truck permitting the rail- way, car to

move up and down under resilient action rela- tive to the side structures, brake discs located on the in- board sides of and rigid with said coaxial wheels respec- 20 tively for rotation therewith, said brake discs presenting respective brake faces on the inboard sides thereof, a pair of brake head levers for said brake discs respectively, a hinae connection between each brake head lever and the corresponding side stiucture supporting the latter brake 25 head lever from the latter side structure for angular movements substantially horizontally about the axis of said hinge connection into and out of brakin.- position in relation to the brake face on the corresponding brake disc means for actuating said levers into braking posi- 30 tio., said levers when in braking positions exerting pres- sures on said side strlictures through said hinge connec- tions in directions having substantial components trans- verse to the longitudinal direction of the truck, and a bar extending between said side structures and pivotally se- 35 cured near its ends to said hinge connections on hinge axes coextensive with the hinge axes respectively of said levers, said bar through said hinge connections - resisting said transverse components of the pressures, thereby hold- ing said side structures against transverse movements re- 40 si.ilting from said pressures and at the same time permit- ting limited relative movements of said side structures along the longitudinal directions of the truck. 2. In a railway car truck, the combination of a pair of opposed substantially parallel side structures extending 45 along the longitudinal direction of the ti-uck, four wheels supported on said side sti- uctures with two wheels on each side of the truck and w@ith earh wheels on one side co- axial with a corresponding wheel on the opposite side, the axes of said wheels extendin.- substantially parallel 50 between said side structures and transverse to said longi- tudinal direction, means for resiliently supporting a rail- way car on the truck perriitting the railway car to move up and down under resilient action relative to the side structures and comprising a truck bolster extending be- 55 tween said side structures and located between the two pairs of coaxial wheels, and spring @-neans supporting the eiids of said bolster on said side structures respectively, means for applying brakes to the wheels comprising brake discs on the inboard sides of the wheels respectively rigid 60 with the wheels respectively fGr rotation therewith and presenting brake faces on their inboard sides, four brake head levers, one for each disc, and a hinge connection between each brake head lever and the corresponding side strlicture for slipporting the latter brake head lever 65 from the latter side structure for angular movements sub- stantially horizontally about the axis of said hinge con- iiection into and out of braking position in relation to the brake face on the corresponding brake disc, said hinge 70 connectioiis being arranged with two being located be- tween one side of the trur-k bolster and the axis of the co- axial wheels on the latter side of the truck bolster and being coniiected to said side stnictures respectively and two being located between the other side of the truck bolster and tLe axis of the coaxial wheels on the latter 75 i4 side of the ti-uck bolster and being coniiected to sai'd si'de structures respectively, said brake head levers when in braking positions exerting pressures on said side structures having substantial conipoiients in inboard directions, and a pair of parallel bars on opposite sides of the bolster extending between the side structtires and each secured at its ends to the side structures through said hinge connections oil hinge axes coextensive with the hinge axes respectively of said levers, said bars serving to resist said inboard compoiients of the pressures and to hold thereby the side structures against inboard movements, and formiiig with said side structures a parallel motion mech- anism permitt:lng limited relative endwise movernents of tlle truck when rounding a curve. 3. In a railway car truck, the conibination of a pair of opposed side structures extending along the longitudinal direction ol the truck, a plurality of wheels supported on said side structures, two of said wheels extending coaxially near opposite sides of the tiuck with their conmon axis extending transverse to said longitudinal direrti on, means for resiliently supporting a railway car on the truck permitting the railway car to move uli resilient action 1-ip and down relative to the side structures, brake discs @!ocated ort the inboard sides of an rigid with said coaxial wheels respectively for rotation therewith, said brake discs presenting respective brake faces on the inboard sides thereof, a pair of

brake head levers for said brake discs respectively, a hinge connection between each brake head levar and the corresponding side structure supporting the latter brake head lever from the latter side structure for angular movements substantially horizontally about the axis of said hinge connection into and out of braking position in relation to the brake face on the corresponding bralce.disc,..means.for actuating said levers into braking positions, said levers when in braking positions exerting pressures on said side structures through said hinge connections in directions having substantial components transverse to the Ion.-itudinal direction of the truck, and a bar extending bet-ween said side structures and pivotally secured near its ends to said side structures- respectively, said bar resisting said transverse components of pressures, thereby holding said side, structures against movements resulting from said pressures and at the sarne time pern-iitting limited relative movements of said side structures along the longitudinal directions of the truck, each of said levers having a section remote from its hinge axis seated on said bar, said bar presenting a seating surface to said lever sectioiis e@t-@iisive enougli to support said levers at said remote sectioiis throughout the 'Lull extent of angular movements of the levers. 4. In a railway car truck, the combination as described in claim 3, wherein the ends of the bars are connected to said hinge connections respectively on hinge axes coextensive wtih the hinge axes of said levers respectively. 5. In a railway car truck, the combination as described in claim 3, wherein each of said brake head levers a first leg extending over and along saidbar and hinged iiear one end to the corresponding h;nge coiinection, said leg carrying the section seated on said bar and remote from the latter end, each of said brake head levers also having a secoiid leg transverse to said first leg and carrying a brake head for a brake slioe. 6. In a railway car truck, the combination as described in claim 3, wherein the brake head levers are intercliangeable in a@iy one of two positions, each of said levers having integral therewith on its lower side remote from its hinge axis a support wear shoe defining its section for seating engagement with said bar when the lattar lever is in one position to coact with one brake disc and having integral therewith a similar support wear shoe on its upper side located substantially directly over the lower shoe for scatin.- engagement with said bar when the lever is tumed upside down in its other position to coactwith the other brake disc.

15 7. In,a railway car tr-Lick, the combination of a pair of opposed substantially parallel side str-actures extending along the longitudinal direction of the truck, four wheels supported on said side structures with two wheels on each side of the truck and with each wheel on one side coaxial with a corresponding wheel on the opposite side, the axes of said wheels extendin.- substantially parallel between said side structures and transverse to said longitudinal direction, means for resiliently supporting a railway car on the tr-u-@k permitting the railway car to move up and down under TeSilient action relative to the side structures and comprising a truck bolster extending between said side structures and located between the two pairs of coax-lal wheels,,and sprin-. means supporting the ends of said bolster on said side structures respertively, means for applying brakes to the wheels comprising brake discs on the inboard sides of the wheels respectively rigid with the wheels respectively for rotation therewith and presenting brake face-s on their inboard sides, four brake head levers, one for each disc, and a hinge connection between each brake head lever and the corresponding side structtire for supporting the latter brake head lever from the latter side. structlire- for angular movements substantially horizontally about the axis of said hinge connection into and out of braking position in relation to the brake face on the corresponding brake disc, said hinge connections being arranged with two being located between one side of the truck bolster and the axis of the coaxial wheels on the latter side of the truck bolster and being connected to said side structures respectively and two bein.- located between the other side of the truck bolster and the axis of the coaxial wheels on the latter side of the truck bolster and being connected to said side structutes respectively, said brake h@ad levers when in @braking positions exerting pressures on said side, structures having substantial components in inboard directions, and a pair of parallel bars on opposite sides of

the bolster extending between the side structures and located between the bolster and the axes of the wheels, ear-h of said bars having its end pivotally secured to the side structures respectively, said bars serving to resist said inboard components of the pressures and to hold thereby the side structures against in@board movements and forming with said side structures a parallel motion ..... mechanism permitting limited relative endwiso movements of the truck when rounding a curve, said levers having respective sections remote from their respective hinge axes seated on said bars, two levers on one side of the truck bolster having their remote sections seated on the bar on the latter side of the track bolster, and the other two levers on the other side of the track bolster having their remote sections seated on the other bar on the latter side of the truck bolster. 8. In a railway car truck, the combination as described in claim 7, wherein each of said brake head levers has a first leg extendidg-along one side of said bolster and along and over the bar on the latter side of the bolster and hinged near one end to the corresponding hinge connection, said leg ca-,rying the section seated on said bar and remote from its hinge axis, each of said levers also having a second leg transverse to said first leg and carrying a brake head for a brake shoe. 9. In a railway car truck, the combination as described in claim 7, wherein the four brake head levers are similar and interchangeable in any one of four positions, each of said levers having integral thereviith on its lower side remote from its hinge axis a support wear shoe defining its section for seating engagement with one of said bars when the latter lever is in one position to coact with one brake disc, and having integral therewith a sirnilar suPport wear shoe on its upper side located substantially directly over the lower shoe for seating engagement with one of said bars when the lever is turned upside down in another position for coaction with another brake disc. 10. In a railway car truck, the combinatioii (f a pair 22903,097 - i6 of opposed side structures extending along the longitudinal direction of the truck, a plurality of wheels supported on said side structures, two of said wheels extending coaxially near opposite sides of the truck with their common axis extending between said side structures transverse to said longitudinal dire- ction, means for resiliently SUP7 porting a railway car on the truck perniitting the railway car to move up and down under resilient action relative to the side structures, brake discs located on the inboard 10 sides of and rigid witl- i said coaxial wheels respectively for rotation ther(-,with, said brake discs presenting respective brake faces on the inboard sides thereof, a pair of brake head levers for said brake discs respectively, a hinge connection between each brake head lever and the 15 corresponding side structure supporting the latter brake head lover from the latter side structure for angalar movements substantially horizontally about the axis of said hinge connection into and out of braking position in relation to the brake face on the corresponding brake 20 disc, means for actuating said lever into braking position, said levers when in braking positions exerting pressurcs on said side structures through said hinge connections in directions having substantial components- transverse to the longitudinal direction of the truck, and a bar extend- 25. ing between said side structures and pivotally secured near its end to said side structures respectively, said bar resisting said transverse components of the pressures, thereby holding said side structures against- transverse movements resultin.- from said pressures and at the same time, 30 permitting limited relative movements of said structures along the longitudinal directions of the truck, said means for actuating said levers into braking positions comprising a substantially horizontal bridle beam extending between the side structures, and means connecting the ends of 35 tll.- beam to the brake head levers for moving the brake head levers into and out of brake applying position, said bridle beam being supported on said bar and being guided thereby for substantially horizontal movement. 1 1. In a railway car truck, the combination as de- 40 scribed in claim 2, said levers having respective sections remote from their respective hinge axes seated on said bars, two lever.- on one side of the truck bolster havintheir remote section seated on the bar on the latter side of the tr- uek bolster, and the other two levers on the 45 other side of the truck bolster having their remote sections seated on the other bar on the latter side of the truck bolster, the means for applying brakes to the wheels also comprisin.- a

substantially horizontal bridle beam extending between the side structures on one side of the 50 bolster, and means connecting the ends of the beams to the two brake head levers respectively on the latter side of the bolster, said bridle beam being supported on the bar on the latter side of the bolster and being -,Uided thereby for substantially horizontal movement. 55 12. In a railway car truck, the..... combination according to claim 3, wherein there is provided a second bar extending between said side structures and pivotally secured near its ends to said side structures respectively, said second bar resisting said transverse components of pres- 60 sures and at the same time pennitting limited relative movements of said side structures along the longitudinal directions of the truck, said second bar presenting a substantially horizontal seating surface adapted to engage the iipper sides of the brake head levers at regions of said 65 brake head levers spaced from the hinge axes respectively of the brake head levers to confine said levers against excessive upward movements. 13. Tn a railway car truck, the combination according to claim 12, wherein said second bar is parallel to and 70 extends above the first-mentioned bar. 14. In a railway car tr-uck, the combination according to claim 12, wherein said bars are separate. 15. Iii a railway car truck, the combination according to claim 12, wherein said second bar is parallel to and 75 extends above the first-mentioned bar, said bars con-

17 atituting a single channel member, the flanges of which present the seating surfaces for the lower and upper sides respectively of the levers. 16. In a railway car truck, the combination according to claim 3, wherein the means for actuating said levers into braking positions comprises a fluid power chamber rigidly secured to said bar and power-transmitting means operated from said chamber for operating said brake head levers substantially at the same time into braldng positions. 17. In a railway car truck, the combination according to claim 1, wherein the means for actuating said levers into braking positions comprises a fluid power chamber rigidly secured to said bar and power-transmitting means operated from said chamber for operating said brake head levers substantially at the same time into braking positions. 18. in a railway car truck, the combination according to claim 2, comprising two bridle beams, one for each pair of brake head levers associated with a corresponding pair of coaxial wheels, means containing a source of fluid power supported on at least one of said bars to form a unit with the truck, transmission means between the fluid power containing means and the beams for operating the beams simultaneously for brake applications, and connections between each beam and the corresponding pair of brake head levers assc>ciated with a corresponding pair of coaxial wheels for moving the latter pair of brake head levers simultaneously into brake applying position. 19. In a railway car truck, the combination according to claim 7, comprising two bridle beams, one for each pair of brake head levers associated with a corresponding pair of coaxial wheels, said beams being supported on said bars respectively for substantially horizontal movements' means for operating the beams simultaneously for brake applications, and connections between each beam and the cortesponding pair of brake head levers associated with a corresponding pair of coaxial wheels, for moving the brake head levers simultaneously into brake applying positions. 20. In a railway car track, the conibination ar-cordi I ng to claim 10, each of said brake head levers having three legs, one of the legs being hingedly connected to the corresponding side stmcture and another leg carrying the brake head, the means connecting the ends of the beam to the brake head levers being connected to the third legs of said brake head levers. 21. In a railway car truck, the combination according k to claim 7, each of said brake head levers having three legs, one of the legs being hingedly connected to the cor- 2,903,097 is responding side structure and another leg carrying the brake head, said combination comprising two bridle beams, one for each pair of brake head levers associated with a corresponding pair of coaxial wheels, said beams being supported on said bars respectively for horizontal movements, means for operatin.- the beams simultaneously for brake applications, and connections between the ends of each beam and the third legs respectively of the corresponding pair of brake head levers associated with 10 a corresponding pair of coaxial wheels for moving the brake head levers simultaneously into br e app positions. 22. In a

railway car truck, the combination according to claim 7, comprising two bridie beams extending across 15 the longitudinal center line of the truck, a pair of axi aligned air cylinders along said center line supported on said bars respectively, a piston in each cylinder, a piston rod connected to the piston and to the center of the corresponding bridle beam, and connections between each 20 beam and the corresponding pair of brake head levers- associated with a corresponding pair of coaxial wheels for moving the brake head levers simultaneously into brake applying positions. 23. In a railway car truck, the combination according 25 to claim 3, wherein each of said levers has three legs rigid with the body thereof, one of said legs having means for hingedly connecting the lever to the corresponding side structure for angular movements substantially horizontal, another leg carrying a brake head and a third leg hav- 30 ing means for connection to a brake power-transmitting member forming part of the means for actuating said levers into braking positions, each of said levers having rigid therewith on its lower side and at a region spaced from the hinge axis thereof a support wear shoe seated on 35 said bar. References Cited in the file of this patent UNITED STATES PATENTS 40 840,991 Coffman ---------- Jan. 8, 1907 878 ' 181 Barber ---------- Feb. 4, 1908 887,030 Byers ---------- May 5, 1908 1,145,416 I-Ersch ---------- July 6, 1915 1,620,508 Ball ---------- Mar. 8, 1927 45 2,037,755 Blomber et al ---------- Apr. 21, 1936 2,131,703 Cottrell ---------- Sept. 27, 1938 2,732,043 Tack ---------- Jan. 24, 1956 FOREIGN PATENTS 50 298,070 Great Britain ---------- Mar. 21, 1929

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